REMARKS

No amendments are made to the present application. Pending in the application are claims 1-3, 5-24, 26-48 and 50, of which claims 1, 12, 30, 32, 39, 40, 43 and 46-48 are independent. The following comments address all stated grounds for rejection and place the presently pending claims, as identified above, in condition for allowance.

EXAMINER INTERVIEW OF DECEMBER 6, 2006

Applicants thank the Examiner for the courtesy of the telephonic interview conducted with Applicant's representative on December 6, 2006. During the telephonic interview, the outstanding Office Action was discussed. In particular, the Heller reference was discussed. In addition, Applicants discussed the definition of the term "co-planar" in the claims.

35 U.S.C. §112 Rejections

In the Office Action, the Examiner rejects claim 50 under 35 U.S.C. §112 as failing to comply with the written description requirement. According to the Examiner, the recitation that the "inner edge of the meniscus aligns with an inner surface of the side wall and an outer edge of the meniscus aligns with an outer edge of the side wall" is not supported by the specification. However, Applicants submit that the specification provides adequate support for this recitation. For example, the specification, on page 10, line 8 specifies that the "meniscus essentially replaces the removed portion of the side wall that defines the aperture". The meniscus is an analogous to a trap door in an opening of a ceiling or floor, or a dowel plug used to fill an opening. Both these elements replace a removed portion of a wall and are flush with a surface of the wall to essentially conceal or counter act the effect of the opening. By *replacing* the removed portion of the side wall defining the aperture, the meniscus has the same size and configuration as the removed portion, thus filling the space left empty by the aperture, and therefore aligns with upper edge and inner surface of the side wall. If the meniscus edges did not align with the inner surface and outer edge of the side wall, the meniscus would not be capable of replacing the side wall. Rather, a *combination* of air and/or fluid in addition to the meniscus would be required to replace the removed side wall, in contrast to the claimed

invention. The use of a virtual wall configured to match and therefore replace a removed portion of the side wall enables for the overall effect, as set forth in the specification, to be essentially zero: the fluid flowing through the channel behaves the same as if the side wall were not missing, due to the presence of the virtual wall. Therefore, the recitation regarding the configuration of the virtual wall meniscus is inherently supported in the specification.

In addition, the specification states that the virtual wall can have zero dead volume. Since the dead volume would be measured as the difference between the channel surface and bottom edge of the meniscus, a zero dead volume requires that the meniscus bottom edge align with the channel surface. Therefore, at least this recitation is clearly supported in the specification.

Definition of Co-Planar

In the "Response to Arguments" section of the Office Action, the Examiner indicates that the recitation "co-planar" includes a meniscus with any portion lying in the same plane as an interface port in a channel side wall, and that such a co-planar meniscus is inherently disclosed in the Howitz reference and the Heller reference. Applicants maintain that the recitation "co-planar" denotes that the meniscus plane is the same as the side wall plane, such that the meniscus aligns with the side wall edges. The co-planar plane of the meniscus is equal to, not a subset of, the co-planar plane of the side wall. Were the Examiner's definition is correct, the use of the term "co-planar" in the claims would be redundant and non-limiting, as the meniscus already must be located along the length of the channel side wall according to the claim language, without specifying that the meniscus is "co-planar". Therefore, the recitation co-planar should be interpreted as requiring meniscus edges to align with edges of a side wall, such that the meniscus is substantially flush with the side wall at both ends.

35 U.S.C. §103 Rejections

In the Office Action, the Examiner maintains and makes final the rejection of claims 1-3, 5-24 and 26-49 under 35 U.S.C. §103. Applicants traverse the rejection and submit that the pending claims distinguish patentably over the cited references.

Applicants maintain that the combinations of the Heller reference, the McCormick reference, the Amigo reference, the Simpson reference, the Howitz reference, the Bjornson reference, and/or the Sundberg reference fail to render the claims obvious. As set forth in the Response to the Office Action dated April 14, 2006, Applicants assert that the claims distinguish patentably over the cited references. First, the cited references, even in combination, fail to disclose or make obvious the recitations in the claims. Second, motivation to combine the references is lacking.

Furthermore, as discussed in the telephonic interview of December 6, 2006, even if the "application areas A" in the Heller device could be considered fluid interface ports, the application areas A are ***not*** formed in the side wall of a ***separation*** channel that is connected to an anode and/or a cathode, as recited in the claims. Rather, if anything, the application areas, as shown in Figure 2, are connected to transverse injection channels. These injection channels are not connected to either an anode or a cathode. In contrast, the claimed invention allows direct interfacing to a separation channel via a virtual wall formed in a side wall of a separation channel, a feature not disclosed in the cited references.

In addition, the cited references, alone or in combination, fail to disclose a fluid interface port forming a virtual wall that replaces a *removed* portion of a side wall, or a meniscus surface that is co-planar with a side wall of a channel. As previously set forth, the term "co-planar" requires that the meniscus surface substantially align with the edges of the side wall, so that the overall effect of the virtual wall meniscus and the opening in the side wall is substantially zero. Such a feature is not disclosed in or obvious from any of the cited references.

In addition, the independent claims specify that the dead volume of the virtual wall in the fluid interface port is less than one picoliter (substantially zero). Because the cited references require a larger dead volume in an injection region in order to properly operate, this recitation is not only not disclosed in the cited references, but also not obvious from the teachings of these references. For example, the Heller reference discusses the advantages of an *enlarged* application area A in terms of sample loading accuracy in column 5, lines 32-35, which teaches *away* from a fluid interface port having minimal size and dead volume, which could provide decreased loading accuracy due to the small size.

In addition, the Howitz reference, in the sixth paragraph of the specification (column 1), specifies that "the length of each individual microcapillary is to be selected such that the target fluid will *spread up* to the capillary ends", with a "meniscus at the end of each microcapillary". In addition, the Howitz references relies on diffusion and/or convection mechanisms to mix a second liquid passing into the microcapillary with a first liquid into the flow channel, which requires a sufficient amount of target fluid in the microcapillary. The Howitz reference therefore requires a substantial amount of dead volume in each microcapillary, precluding formation of a virtual wall with minimal dead volume.

As set forth in the Manual of Patent Examining Procedure 2143,

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.
>
> The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

These criteria are not met in the current rejection. First, motivation to combine the references is lacking. For example in *In re Fulton*, 391 F.3d 1195, 73 USPQ2d 1141 (Fed. Cir. 2004), the court emphasized that the proper inquiry is "'whether there is something in the prior art as a whole to suggest the *desirability*, and thus the obviousness, of making the combination...." In fact, the prior art teaches away from minimizing a virtual wall fluid interface port with minimal or zero dead volume to facilitate direct interfacing with a channel interior.

In addition, Applicants position that motivation is lacking is bolstered by the fact that the modifications proposed by the Examiner render the prior art invention being modified unsatisfactory for its intended purpose, change the principles of operation of the device and require a substantial reconstruction and redesign of the elements. (See *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984), and *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA

1959) and . If the device of Heller were modified as suggested by the Examiner, it would be inoperable for its intended purpose, because the efficiency of the sample loading could be compromised by the smaller fluid interface port. If the microcapillaries of Howitz were modified as suggested by the Examiner, diffusion of a dosed liquid in a target fluid within the microcapillary could not occur, as target fluid would not spread up to the ends of the microcapillary, as required by Howitz. Because the changes to the configuration of the capillaries of Howitz and application areas of Heller would require a substantial reconstruction and redesign of the elements, as well as a change in the basic principle under which the devices were designed to operate, the claimed invention is not obvious over the cited references.

The particular dimensions of the claimed fluid interface port allow the claimed device to perform in a particular manner not disclosed in the prior art. In fact, were the interfacing components in the cited references to have the claimed dimensions, the operation of the prior art devices would be significantly altered.

Second, a reasonable expectation of success from the combination suggested by the Examiner is lacking. There is no indication that modifying the references to include a virtual wall fluid interface port of the claimed configuration and dimensions would be successful.

Finally, all the claim limitations are not taught or suggested by the prior art. As described above, even in combination, a virtual wall fluid interface port having minimal dead volume and the claimed configuration and dimensions is not disclose or obvious from the prior art. In fact, the prior art teaches toward maximizing dead volume.

As described above, all pending claims distinguish patentably over the cited references. For at least these reasons, Applicants request that the rejections under 35 U.S.C. §112 and 35 U.S.C. §103 be reconsidered and withdrawn.

CONCLUSION

For at least these reasons, Applicants respectfully submit that all pending examined claims are patentable, and request that the objections and rejections be reconsidered and withdrawn.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Dated: December 11, 2006

Respectfully submitted,

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